Changes of Factor Cost and Upgrading of Economic Structure:
An Economic Analysis on the Necessity and Focus of Launching the Supply-side Structural Reform
LI Daokui, JIN Xingye, ZHANG Chi

Abstract: Based on the changes of factor cost in the current stage of China’s economic development, this article conducts an academic analysis on the necessity and the foothold on launching the supply-side structural reform. From our perspective, unlike the reforms launched in the early 1980s and the late 1990s that centered around issues of “shortage” and “close-down, suspension, mergers and transition of operations”, the supply-side structural reform makes adjustments on the economy based on the changes taking place on the current cost of labor, land, environment, capital and technology, among other factors. Based on this analysis and against the backdrop of the downward pressure on the Chinese economic growth, we believe that the focus of this round of supply-side structural reform should be placed at the industrial and agricultural developments, infrastructure building and capital bubble squeezing. For industries experience excess capacity, the government should speed up reform efforts and make determined choices to facilitate industrial upgrading; for issues of price inversion prominent in the domestic and international grain market, the government should, on the premise of safeguarding the land fertility, facilitates the imports of food and the release of labor and land resources. To address the phenomena of huge aggregate amount of infrastructure investment with limited per capita investment, the government should attach importance to the balance between the diversification of investment subjects and the regional construction projects. As the interest is relatively high in the capital market, the government should squeeze out the bubble and manage the interest rate within a reasonable range. All these policy initiatives also exert counter-influence on the above-mentioned five elements to some extent, thus they are conducive to the release of growth potential and the easing of pressure.

Key Words: Factor Cost, Economic Structure, Supply-side Reform

I. Introduction

In November 10, 2015, when China was experiencing adjustments against the backdrop of economic downturn, President XI Jinping has stated at the meeting of the Central Financial Leadership Group that, “We shall moderately expand aggregate demand, and in the meantime, we should step up efforts to implement the supply-side structural reform and enhance the quality and efficiency of the supply system.” The term
“supply-side structural reform” has thus entered the vision of the general public for the first time, and the supply-side structural reform has also become the cornerstone for bolstering China’s growth and development. The reform initiative could serve as the remedy for addressing the structural issues faced by the Chinese economy on the basis of demand management, and could facilitate the releasing of mid-to-long term growth potential. However, the technical requirements and the underlying risks for “scraping the bones for remediying poison syndromes” are higher than those of “curing the headache by treating the head”. Therefore, we should take a holistic view for the specific measures during structural adjustments.

Since then, the supply-side structural reform has become the focus of society, and numerous discussions have taken place among the economic community. However, most of these discussions focus on the background of the supply-side reform and the specific measures for implementation, whereas few answers have been offered to explain the reasons for implementing the supply-side reform or the economic analysis on the logic behind. This paper attempts to analyze the changes of factor cost in China in light of the country’s current stage of economic development. The article attempts to analyze the principle of supply-side structural reform and put forward the key directions for implementing the reform, and leads to an academic analysis of the current round of reform.

Taking a retrospective look at the past 30 years since China’s reform and opening up, China’s economic reform can be broadly divided into three stages. The first stage of the reform took place in the 1980s, when the focus was placed at addressing “issues of shortage”. One of the major reform initiatives was to provide economic entities with more incentives to stimulate production. The second stage started from the end of 1990s till the start of the 21st century, when the Chinese economy encountered the shock from the international economy, and the productivity of industrial enterprises was so low that there was large-scale bankruptcy. During this stage of the reform, the government rolled out the measures of “close-down, suspension, mergers and transition of operations” to promote reorganization of debt, talent, capital and other factors and improve economic efficiency. Currently, we have entered the 3rd stage of the reform. During this round of reform, the focus is no longer placed at the “issues of shortage”, nor resorting to “close-down, suspension, mergers and transition of operations” to improve efficiency, but to restructure the economy in light of the changes in the cost structure. Over the past decade or so, major changes have taken place in the relative scarcity of China’s economic factors, and they reflect more of the changes of the factor cost. For instance, costs of land, labor and environment have increased by a large margin, but with the accumulation of wealth and globalization, the costs of capital and technology have been evidently lowered. We believe that the changes of the factor cost constitute the fundamental momentum of this round of supply-side structural reform. We need to transform our current labor-intensive economic structure into the capital and technology-intensive one. We need to use our land resources in a more efficient way and leverage the capital and technology for mitigating the negative impact posed on the environment.
On the basis of the above-mentioned reasons, we believe that the supply-side structural reform should focus on such aspects as the industrial sector, the agricultural sector, the infrastructure building and the squeezing of capital bubble. To address issues of excess capacity in certain industries, the government should pace up its reform endeavors and take bold measures to facilitate industrial upgrading. To resolve problems of reverse pricing of domestic and international grain prices, the government should, on the premises of ensuring the land fertility, free up the labor market and land resources. To tackle the phenomenon of huge aggregate infrastructure investment with low per capita amount, the government should squeeze the bubbles and manage the expectations of interest rates within a reasonable range. All these measures exert counter-influence on the five elements specified above, and are thus conducive to the release of potential and the relief of burden.

DENG Lei & DU Shuang (2015) hold the opinion that the supply-side structural reform is an inevitable choice during the New Normal. By establishing a two-way adjustment system, the reform aims to leverage three driving forces, namely, the system, the innovation and the structural adjustment, and to focus on the structures of factors, suppliers and industries, which eventually lead to the economic development. LI Chong (2016) approaches the analysis from the perspective of short-term and long-term supply and demand, and points out the urgency of supply-side reform and the necessity of the dynamic balance between supply and demand. Hence, the focus of the reform shall be the science and technology, human resources, structural adjustments and the economic system. SHEN Kunrong (2016) believes that the core of the supply-side management lies in the improvement of total factor productivity. During his speech delivered in the Shanghai Jiaotong University, WU Jinglian (2016) points out the supply-side reform is not a mere structural adjustment, but rather, the reform requires the concerted efforts from the government and the market to foster a favorable environment for improving efficiency. During his interview with the Xinhua News, LI Yining (2016) proposes that the supply-side reform should place more emphasis on adjusting the economic structure by improving industrial policies and methods of allocating resources, and the attention should be given to the mid-term impact. LIN Yifu (2016) commences his study on the Chinese economy by analyzing the status-quo and the challenges faced. He proposes that the government should address the challenges from both the supply-side and the demand-side, and enhance the mid-to-long term macro adjustments for increasing effective supply, thus fostering favorable conditions for structural reform.

Research efforts have been committed from the government and the academia to the changes of factor costs, including but not limited to the costs of labor, environment, land, capital and technology. DONG Zuoji (2016), representative of the National People’s Congress (NPC), proposes that the reform of the household registration system is the cornerstone of the institutional reform of the land system, and the innovation in the land system will play a major role in implementing the supply-side structural reform. ZHANG Yaodong (2016) from the Ministry of Environmental Protection elaborates on the significant role played by the environmental protection on facilitating the supply-side reform from five aspects, i.e., cutting excessive industrial capacity,
destocking, deleveraging, lowering corporate costs and improving weak links. CAI Fang (2016), Vice President of the Chinese Academy of Social Sciences, elaborates on the significance of labor factors in the supply-side reform from four aspects, i.e., adjusting the labor participation ratio and the family planning policies, nurturing human capital and reforming and household registration system. Based on the inspection of the Yangtze River Delta region, BO Peiwen & YANG Zhicai (2016) points out that the distorted allocation of capital factors in the region are in accordance with the local economic development and the degree of marketization. To address the distortion of capital factors, the government should proactively advance the supply-side structural reform. All these discussions have touched upon the challenges faced by the current supply-side reform and offered corresponding policy recommendations. As far as this article is concerned, the author holds that the changes of the structure of factor costs are the fundamental reasons behind the supply-side reform. The changes of the factor costs of the Chinese economy have brought along the changes in China’s domestic industrial structure, and have led to the changes of the landscape of division of labor between China and the world. The changes of domestic and international economic trend driven by the changing factor costs are the driving forces behind the supply-side structural reform.

Overall, the discussions on the supply-side structural reform cover an extensively wide area. This article advocates that four major areas have become the target of the reform during its implementation, namely, addressing the industrial overcapacity, reforming the grain reserve system, improving the infrastructure investment and reform the capital sector, and that enough attention should be given to these areas. Discussions on addressing the industrial overcapacity have been abundant. For instance, LIU Jianjiang et al. (2015) reviews the international experience and proposes that the government should enhance macro-control and institutional innovation. We should also improve market mechanisms and optimize industrial structures. In addition, we should increase investment in science and technology and expand effective demand. Moreover, we should implement the six major measures for implementing the “going global” strategy to address China’s industrial overcapacity. ZHANG Zhao’an (2015) proposes that we should leverage the special role played by the financial policies in absorbing the industrial overcapacity. Research Group of the State Information Center (2016) proposes that we should enhance policy coordination and implement the policy of “mass innovation and entrepreneurship” to tackle the excess capacity. However, judging from the status-quo of China’s industries, this paper advocates that the government should not only shut down the backward enterprises, but also facilitate reemployment and reduce frictions in the labor market. Meanwhile, we should press ahead with bankruptcy restructuring and upgrade our production, thus fostering new growth points for the generation and development of industries.

In spite of the abundant discussions on how to address the industrial overcapacity, the academia has generally reached the consensus in the issue of reserve grain and basically advocates the state’s policy of acquiring reserve grain. ZHANG Honglei (2005) supports the policy as it helps ensure the role of managing
grain market by the state and achieves an overall balance of grain supply and demand. ZHANG Ruijuan & REN Xiaona (2016) advocate that we should improve the engagement of farmers to grow more grain and enhance grain production. ZHANG Suqin (2016) holds that we should stabilize the price of agricultural products and safeguard farmers’ benefits. All the aforementioned academic discussions acknowledge the policy of acquiring reserve grain from the positive aspect. Though LI Quangen (2016) does not negate the policy, but he mentions that the current grain management system resembles the traditional planning system in terms of their contents, functioning methodologies and characteristics. Different from numerous studies on the subject, this article holds that the market forces help ensure farmers’ benefits while safeguarding grain security. Specifically, the government should leverage the subsidy policies and reform the reserve grain system with market forces. Under the premises of ensuring domestic land fertility, the government may press ahead with reserving grain cotton through imports.

As for the infrastructure investment, there has been rhetoric over the excessiveness plaguing China’s infrastructure investment sector. WEI Mengxing (2012) conducts a study under the counterfactual framework and adopts the latest method of evaluating the effects of macro policies. According to the research findings, the long-term effect of the “4 trillion RMB” investment has not been evident. SUN Zao et al. (2015) conducts an analysis on China’s infrastructure sector based on the panel data from 2003 to 2012. The study holds that China has undergone an intense wave of infrastructure investment, which exerts a repressive influence on China’s economic growth to some extent. Therefore, the government should adjust the investment to reduce excess capacity in the infrastructure sector. This article argues that despite the significant growth in infrastructure construction, there is still relatively large room for improvement in per capita investment and regional balance. The government should diversify its investment entities, narrow the gap between regions and strengthen investment on the environmental protection.

Finally, in terms of the reform in the capital sector, numerous scholars believe that the relaxation of interest rate control will lead to certain risks. JI Yang et al. (2015) points out that the interest rate marketization will, to some extent, force some banks into bankruptcy, or become dependent on financial subsidies. QIAN Xuehong (2016) points out that interest rate marketization has more impact on small and medium-sized banks, and the risks faced by small and medium-sized commercial banks are more prominent when the marketization of deposit and loan interest rates does not match with each other. In view of the short-term interest rate market risk, this article conducts the analysis based on the status-quo of China’s capital sector, and holds the opinion that the government should smooth the mechanism of monetary policy transmission, improve the mechanism of liberalizing interest rate in China, and guide investors’ expectation into a reasonable range.

The remaining parts of this article are structured as follows: The second part analyzes the economic situation faced by the supply-side structural reform. The third part expounds the changes in the relative scarcity of the five major production factors of the Chinese economy in the early stage of the 13th Five-Year
Plan. Such changes are the fundamental driving forces behind the supply-side structural reform of the Chinese economy. The fourth part focuses on the analysis of the main tasks and the starting point of the supply-side structural reform. The fifth part includes the summary and policy recommendations.

II. Economic Situation during the Outset of the “13th Five Year Plan”

Before analyzing the supply-side structural reform, we should first analyze the backdrop against which the reform is rolled out. Since the latter half of the year 2016, China’s economy has stabilized towards growth, manifesting three bright spots.

First, the economic structure continues to improve. Judging from China’s industrial structure, in 2016, the proportion of added value in the tertiary industry reached 51.6%, an increase of 1.4 percentage points compared to the year 2015. Structure within an industry has also been constantly adjusted and optimized. The high-end manufacturing of the secondary industry and the financial and Internet services of the tertiary industry have seen their shares rising in the entire industry. Judging from the domestic demand, structure of investment and consumption has continued to improve. The final consumption in the year 2016 has contributed to 64.6% of the total growth. According to the estimates of Center for China in the World Economy (CCWE) at Tsinghua University, China’s consumption accounted for more than 47% of the total GDP, and is expected to surpass 50% by 2020. The original investment-driven growth pattern will be gradually changed. Judging from the foreign trade, despite the severe challenges and increasing volatility faced by foreign trade, the export structure has continued to improve. The share of high-tech, high value-added export products continues to increase, such as the products related to high-speed rail, communications equipment manufacturing, machinery and heavy industry.

Second, China has an enhanced say on the international economy and financial affairs. On the one hand, China’s GDP growth in 2016 ranks first among global major economies, contributing more than 30% to world economic growth. China thus maintains its position as the biggest engine of global economy. On the other hand, the facts that China successfully held the G20 summit in 2016, President XI Jinping addressed the Davos Forum, the RMB’s inclusion into the SDR basket, the smooth operation of Asian Development Bank and BRIC Bank, the progress achieved in the “Belt and Road” initiative all indicate that China is carrying the banner of international economy and financial governance and witnessing an increasing say over international affairs.

Third, the continuous emergence and growth of the new economy, the new business models and the new momentum have become the major driving force behind the economic restructuring and growth engine transformation. Strategic emerging industries, which include high-end equipment manufacturing, new energy and new materials, next-generation information technology, bio-pharmaceuticals, energy conservation and environmental protection, now account for 10% of the total GDP. The sharing economy represented by the
rapid development of MO bike and sharing bikes have become the classic practice of “Internet + Traditional Industries”.

To further analyze the complex environment during the early stages of the “13th Five Year Plan”, we believe that the Chinese economy is currently facing two major risks as follows. First, turbulence remains in the international situation, especially the uncertainties brought forward by the Trump administration’s new policies on the international economic and financial environment. The Trump Administration may introduce measures of trade protectionism, infrastructure investment, Fed rate hikes, fiscal stimulus that might have an impact on the global economic and financial markets, especially for China’s export growth and exchange rate stability. The EU economic recovery is relatively vulnerable, and factors such as the political elections, refugee crisis, non-performing bank loans, conservatism all bring uncertainties to the economic growth and financial stability both within the EU and around the globe. Divergence between developed and emerging economies and the gap within the emerging economies will become ever more prominent, and global liquidity might face a short-term inflection point.

In the United States, the economic performance in 2016 and recent economic data will consolidate the newly-elected US President Trump’s confidence in implementing the “America First” policy and striving to achieve ”nominal GDP growth of 5%”. Although Trump has not seen its intended major policy shifts implemented, that does not necessarily mean that the “Trump risk” has weakened. China still needs to be highly concerned about the relevant US economic policies and get prepared to risk response, especially in terms of trade protectionism and interest rate hikes.

In terms of trade protectionism, Trump concisely summarizes its trade claims as “buying American goods and hiring American people”. At present, the United States has withdrawn from Trans-Pacific Partnership (TPP); the Border Adjustment Tax (BAT) which China is very much concerned has not yet been implemented. If BAT is to be implemented, China’s exports may be further deteriorated, given China’s high share of exports to the US.

In terms of the possibility of interest rate hikes in 2017, the Federal Reserve is likely to accelerate the rate hike process as the employment and inflation data show rosy aspects. Janet Yelen, along with other officials from the Federal Reserve, has conducted multiple rounds of forward-looking guidance in early March. According to the Bloomberg rate market inspection, the Federal Reserve has the probability of 100% to increase interest rates in June. According to CME “Federal Reserve Watch”, the Fed is 95.9% likely to increase the interest rates in June. The Fed’s rate hikes will lead to a stronger dollar, and global liquidity will face marginal contraction. Meanwhile, the devaluation of the Renminbi and pressure on the capital outflows may be mounting.

As for Europe, data related to the recent economic growth, employment and PMI in the euro zone have a more positive performance. In 2016, the euro zone’s economic growth rate reached 1.8%, surpassing the US’s
In 2017, the euro zone’s PMI reached 54.4 in January 2017. Amid the overall economic recovery, the divergence within the euro zone is worthy of attention. In particular, it should be noted that the high nonperforming loan ratio among banks in Italy and other countries may become risk events for another time in 2017.

In 2017, compared with the economic performance, Europe’s biggest risk may come from political uncertainty. Germany, Italy and Belgium have ushered in the election of the highest political leaders, and the Brexit process has also been launched. The possibility of domino-style black swan events still exists in the European political arena. Populism is on the rise, and Frauke Petry, the leader the German right-wing Populist Party AFD, known as the “German Trump”, oppose the euro and antagonize further European integration and advocate to stall refuge acceptance. Even policies suggested by Angela Merkel, the current German Prime Minister, along with her party, have the tendency to reverse under the pressure of public opinion and election. If such a populist party wins in the forthcoming election, it is highly likely that the process of European integration would undergo major shocks. The euro might suffer from a slump, and the European economy will be mired in a continuous quagmire.

Second, the domestic financial sector is facing latent risks, and improper tackling of such risks might wreck havoc on the overall situation of “achieving progress while maintaining stability”. First, risks remain in the possibility of depreciating RMB exchange rate and capital outflow, and with the two feedback cycle, the trend may be further strengthened. Second, the increasing tendency of non-performing ratio of the banking industry has moderately declined, but still has not been fundamentally curbed. Third, excessive leveraging of the non-financial enterprises and the accumulation of local government debt risks continue to be exacerbated.

Since 2017, the Renmibi (CNY) exchange rate against the US dollar and the basket of currencies has stabilized. As of March 11th, the onshore CNY against the US dollar has appreciated by 0.5% at the end of 2016, and the offshore RMB has appreciated by 1.2%. Offshore CNY valuation exceeds the onshore RMB, and the long-term premium rates of both onshore and offshore CNY have been lowered. While the exchange rate has been stabilized, the pressure on capital outflows has also slowed down. In January 2017, when foreign exchange reserves fell below CNY 3 trillion for the first time, the foreign exchange reserves have witnessed the first correction since June 2016, and returned to the amount above CNY 3 trillion. According to the estimates of the Center for China in the World Economy (CCWE) at Tsinghua University, the broad capital outflow from January to February 2017 has reached 20 billion US dollars. Compared to the USD 549.2 billion in 2016 and USD 755.5 billion in 2015, the capital outflow has been stabilized.

Since 2017, uncertainties have been mounting over the policies of the United States and other developed countries, and the dollar index fell by about 1%. However, indicators related to domestic investment, consumption and industrial enterprises profits have stabilized, which offers China a better window of opportunity to promote the capital market reform. While efforts have been made to enhance the authenticity of
the trade settlement and sale of foreign exchange as well as prudent management of domestic enterprises’ cross-border investment and financing, the inter-bank market internationalization has also been promoted. On February 27th of this year, State Administration of Foreign Exchange (SAFE) issued a notice to allow foreign non-central bank investors to participate in the domestic foreign exchange derivatives market. This policy would significantly reduce the foreign exchange hedging costs of foreign investors and will help attract more foreign capital into the Chinese bond market.

![Figure 1 US Dollar’s Exchange Rate against Onshore and Offshore CNY](source)

Source: WIND database, CCWE estimates

![Figure 2 CNY Exchange Rate against CFETS basket(Using December 31 2014 as base period)](source)
III. Changes of the Structure of Factor Costs

Based on the economic development in recent years, the “13th Five-Year Plan” proposes that we should “focus on promoting the supply-side structural reform so that the supply capacity can meet the general public’s growing needs for accumulating material wealth and preserving ecological environment”. In fact, the production factors that exert the most profound influence on people’s daily production and life are nothing more than land, environment, labor, capital and technology, but in reality, the costs of these five factors have undergone changes with the advance of the economy. To achieve the goal of meeting the people’s needs, we believe that the changes in the cost of the five factors play a key role in promoting the supply-side structural reform. Only if we fully understand how the changes in these five factor costs can be applied to reform can we fundamentally complete the supply-side structural reform.

1. Surging Cost of Labor

China has a large population that ranks first in the world. In 2015, the national population census shows that China’s total population reached 1,375 million people, of which the population of 16-59-year-old working age has reached 910.96 million, accounting for 66.3% of the total population. Large number of cheap labor has bolstered the rise and development of numerous labor-intensive industries. However, after 30 years of reform and opening up and along with China’s rapid economic growth, China’s labor costs have been increased by a large margin. According to the official data released by the National Bureau of Statistics, the per capita disposable income of Chinese residents in 2015 was 21,966 Yuan, a nominal increase of 8.9% over the previous year, equivalent to real-term increase of 7.4% excluding the inflationary factor. In the meantime, China’s GDP growth rate was only 6.9%, lower than the per capita disposable income of residents.
The increase in the amount of compensation for work injury accidents can also prove the increasing labor costs from another perspective. According to the latest publication on compensation for work-related accidents, we can see that the compensation for work-related accidents includes medical expenses, hospital food subsidy (70% of the food subsidy standard), transportation expenses, food and accommodation, rehabilitation and auxiliary equipment fees, paid leave, nursing fees, disability allowance, one-time disability employment grant, home subsidies, etc. Among them, the work injury medical expenses, disability allowance, one-time disability employment grants and home subsidies are not included in the scope of the work injury insurance fund, and the employer is required to act as the compensation agency and bear the liability. As the costs of housing, transportation, medical care and other industries continue to increase along with the consumption prices, it is clear that the employer’s economic pressure will further fuel the increase in the labor costs, which to some extent further increases the price of the service industry, forming a circular rising process.

In contrast to the mounting prices, reserve and supply of labor have been on the decline. Due to the long-term implementation of China’s family planning policy in recent years, the aging of the population has become a serious phenomenon. Under the existing retirement system, the new working age population is on the decline. According to the relevant data released by the National Bureau of Statistics, in 2015, the total number of working-age population between 16-59 in China decreased by 4.87 million from the previous year, and the absolute number has declined for the fourth consecutive year. At the same time, due to the severe employment situation in China, there is still a very large base for working age population, which exceeds 900 million. However, in 2014, China’s working population only reached 773 million people. Moreover, due to the improvement of the educational level, the salary expectation of the labor force is increasing. Under the integral influence by the two factors, they further fuel the increase in labor costs.
2. Increasing Cost of Environmental Protection

Over the past 30 years of reform and opening up, China’s enterprises have achieved economic takeoff, and at the same time, the country has also encountered the most complicated problems faced by its western developed counterparts during the corporate development -- environmental damage, i.e., water pollution, soil desertification, haze weather, etc. All these issues have attracted broad attention from the society. Corporate demand for resources and environmental protection have become the main contradiction of sustainable development of enterprises. As we explore how enterprises should carry out environmental protection and assume the social and legal responsibility, the environmental cost of the enterprise has been greatly mounted with the wheel of the economy rolling on.

Judging from the perspective of corporate development and taking manufacturing as an example, we may divide environmental costs into different categories according to their different stages, and the classifications are specified as follows.

<table>
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<tr>
<th>Stage</th>
<th>Category</th>
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<tbody>
<tr>
<td>Procurement</td>
<td>(1) Purchasing cost of raw materials</td>
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<td>(2) Cost of purchasing and renewing equipment</td>
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<tr>
<td>Production</td>
<td>(1) Direct cost of emission reduction</td>
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<td>(2) Cost of R &amp; D</td>
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<td>(3) Cost of prevention</td>
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<tr>
<td>Sale</td>
<td>(1) Cost of packaging</td>
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<td>(2) Cost of social benefits</td>
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<tr>
<td>Post Sale</td>
<td>(1) Cost of maintenance and repair</td>
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<td>(2) Penalties</td>
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Thus it can be noted that the impact of environmental costs is evident throughout the production and operation of the enterprises. First, during the procurement stage, influenced by the relevant laws and regulations, government policies and the current global economic development, many raw materials are restricted and even prohibited due to the scarcity of these resources or the international situation, and enterprises must pay a higher premium for the use of such raw materials. Second, due to the rapid development of the industrial chain, product replacement rate can not be accurately estimated, and purchasing and replacing the equipment capable of producing green products also involves the mounting environmental cost for the enterprise during its production and development.

Second, during the production stage, the substantial increase of environmental costs causes even bigger trouble for the corporate development. Direct cost of emission reduction refers to the cost that enterprises should pay for investing in the waste management, use of renewable systems and alternatives of contaminated
material during the production phase so as to meet certain production standards. R & D cost refers to cost related to the design of green products, upgrading of eco-industrial chain, waste recycling and other technology research and development, which constitutes the necessary investment during enterprises' development in the eco-civilization. The cost of prevention refers to the funding for environmental education, testing, metering and certification. As nowadays the green ecological concept has been gradually enhanced, it is also an important part of increased corporate environmental cost.

The cost of sale in the third stage mainly includes two aspects. Packaging cost, as its name suggests, refers to the environmental packaging of the green products during the stage of sales and the cost of recycling of the polluted packaging. The cost of social benefits refers to the corporate investment and sponsorship in green production environment, improving brand image or environmental advertisement aimed to improve the social benefits. In the early stages of corporate development, enterprises consider a relatively smaller number of environmental factors, but in recent years, a number of environmental problems force enterprises into focusing on environmental issues on the impact of corporate development, thus increasing the environmental costs of enterprises.

In the final stage, even if the products have been successfully sold, the company still have to pay for the pollution and damage caused by its production and business activities and settle the penalties for maintenance and repair; at the same time, for public interest litigation, enterprises will face huge compensation and fines, among other costs.

In addition, from the perspective of government decision-making, there are two factors that contribute to the gradually mounting environmental costs.

Policy measures refer to the promulgation of the new environmental law. In April 2014, the Eighth National People’s Congress (NPC) examined and approved the new “Environmental Protection Law” and the law has become a milestone in China’s environmental construction. After the implementation of the new law, known as the “the most stringent environmental law in history”, it is prohibited to follow environmental procedures in expired dates, and enterprises should pay for the fine on a daily basis, relevant responsible persons may be subject to administrative detention and the environmental protection department are authorized to take coercive measures under certain conditions to constrain the behavior of polluting enterprise. These measures force enterprises to pay attention to green environmental developing during its operation for even the slightest carelessness might cause huge environmental costs.

The collection of sewage charges is an economic means for the government to enhance environmental governance. In the past, in order to encourage the development of enterprises, sewage charges are levied on a set of uniformly low standards. As a result, some companies would rather pay more fees than take measures conducive to environmental protection. In September 2014, the National Development and Reform Commission issued jointly with the Ministry of Finance and the Ministry of Environmental Protection the
“Notice on the Adjustment of Sewage Charges Levying Standards and Other Issues”, requiring provinces (autonomous regions and municipalities) to increase the sewage charges standards by the end of June 2015. The new regulations require enterprises to strengthen the online pollution detection and establish a restraint incentive mechanism to implement a differential policy for stimulating corporate environmental protection. For example, Beijing municipality specifies that sewage charges for sulfur dioxide, nitrogen oxides, chemical oxygen demand will be increased to 10 Yuan per kilogram, ammonia pollution charges will be increased to 12 Yuan per kilogram (far exceeding the sewage charges for sulfur dioxide and nitrogen exhaust gas of 1.2 Yuan per kilogram), and chemical oxygen demand (COD), ammonia nitrogen and five major heavy metals (lead, mercury, chromium, cadmium) pollutants in sewage are increased to no less than 1.4 Yuan per pollution equivalent.

Thus, the rise in environmental protection costs is the catalyst of supply-side structural reform. Backward production capacity and excess capacity are constraints and stumbling blocks that stall China’s economic sustainable development. In particular, major polluting industries such as steel, coal which have irrational industrial structure are the main reasons behind worsening pollution. Although addressing environmental problems might increase the threshold of certain industries, they are effective measures for promoting the development of high-quality production capacity and limiting the expansion of low-end production capacity. The main task for production capacity lies in the supply-side structural reform, and therefore, it is a necessary choice that we should promote eco-friendly products, expand the market demand and stimulate consumption.

3. Mounting Cost of Land

China covers a large area of land, and the land-based investment model has been established since the founding of the Shenzhen Special Economic Zone. The cheap land supports the rise of many cities in China. However, after 30 years of reform and opening up, especially after nearly 20 years of housing reform, China’s land use costs have increased by a significant margin. Taking the price of the comprehensive use of land released by Ministry of Land and Resources for example, from 2001 to 2015, the nominal price of land has increased from 1739 Yuan / square meter to 3522 Yuan / square meter, or nearly 100%. Even if the price factor (in accordance with the annual GDP deflator excluding inflation) is also taken into consideration, the increase still stands at more than 17%. Given the GDP deflator measurement of inflation in the past 15 years is generally higher than the consumer price index measurement of the level of inflation, the actual cost of land should be higher.
We can analyze the land transfer contract price and draw conclusions on the change of land cost from another angle. According to the reports released throughout the years of the National Bureau of Statistics and the Ministry of Land and Resources, we will track the state-owned land sales surface and the contract price and accordingly calculate the price per square meter of land transfer. This price is the enterprises’ price for “acquiring land”, that is, pure land rent. Since 2004, the transfer price has increased from 354 Yuan / square meter to 1345 Yuan / square meter, a nominal increase of nearly 400%. According to the GDP deflator after deducting price factors, the increase still reaches 126%. Therefore, it should be noted that the market value of land has increased significantly over the past 15 years.

In contrast to the rising prices, the land supply has been on the decline. As China’s territory contains a
large number of mountains and rivers and other unsuitable areas for development, in recent years, besides the red line on the “cultivated land”, new restrictions have been added on the environmental protection, and the state approved construction land began to shrink. Taking the data of the actual supply of state-owned construction land released by the Ministry of Land and Resources as an example, the value of the land supplied reached its peak in 2013 after three consecutive years of decline. In 2015, the figure fell more than 10% year on year. This trend is consistent with the changing trend of state-owned land transfer area, which reflects the increasingly tense situation of land resources.

![Figure 6 State-owned Construction Land Area (10,000 hectares)](image)

Source: National Bureau of Statistics

Land is the basic resource of economic development. Under the new situation of mounting costs and reducing supply, it is necessary to allocate land use as much as possible in accordance with market efficiency and shift away from the idea of extensive operation in the past. In terms of industry, the quality of land development and the benefits generated by land use need to be further improved, and we should gradually realize differentiated land use. On the one hand, we should safeguard the innovation and development and ecological use of land; on the other hand, the industries that cover a wide area of land with high risks and low value-added, such as the mining industry, should gradually give way to the intensive high value-added enterprises to contribute to industrial restructuring and upgrading. Stimulated by the mounting cost, we should press ahead with the supply-side structural reform, and ensure that the reform exerts a counter influence over the current rising costs of land.

4. Lowered Cost of Acquiring Capital

Capital is a key factor in the development of a country’s economy. Adequate capital can provide a strong material guarantee for the development of the country’s economy and occupy a dominant position in foreign trade against the backdrop of increasing economic globalization. Different from the previous analysis on factors of labor, environmental protection and land, the cost of capital has not witness increases, but rather
showing a downward trend, and the underlying reason is China’s growing economy and the increasingly prosperous country. The growth is mainly manifested by the increase of capital reserves, the expanded scale of foreign investment, the widened trade balance between import and export, and the increasing important role in international affairs as evident in the “Belt and Road” Initiative.

In terms of China’s capital reserves, the scale of foreign exchange reserves significantly expanded from the USD 165.574 billion at the beginning of the century to USD 384.32 billion in 2014, reaching the highest point since the 21st century. Compared to the beginning of the century, the figure has risen more than 23 times in the past decade or so. Although at the beginning of 2015, China’s foreign exchange reserve has witnessed a certain decline, but it is still maintained at a level of over USD 3 trillion.

![Figure 7 China’s Foreign Exchange Reserve (100 million USD)](image)

Source: State Administration of Foreign Exchange

The growth of China’s capital reserves is also reflected in the changes in the gap between China’s import and export. The trade surplus is one of the major ways for a country to obtain foreign exchange reserves. China’s import and export balance has been on the rise since the beginning of the 20th century, although it has declined in 2008 due to the impact of the subprime mortgage crisis around the globe. However, during the 15 years from 2000 to 2015, China’s import and export balance has been increased from USD 24.11 billion to USD 593.04 billion, an increase of nearly 25 times.

![Figure 8 China’s Import and Export Balance (100 million USD)](image)
With the increasing capital reserves in China, the scale of foreign exchange reserves has been expanding, and China has even witnessed cases of capital surplus. On the basis of sufficient capital for supporting China’s domestic economic production activities, there can be surplus funds to invest overseas. China’s foreign investment increased from USD 26.56 billion in 2007 to USD 145.67 billion in 2015, and in less than a decade, the rate of increase was more than five times.

![Figure 9 China’s Net Foreign Direct Investment (100 million USD)](image)

It should be further clarified that capital cost reduction elaborated in this part refers to the increasing accumulation of capital in China. From the macro perspective, the supply of capital has increased compared with the past, but not the borrowing cost of private enterprises. Judging from the status-quo, the central bank has cut rates for four times in the year 2015, and since January 24, 2015, China’s one-year lending rate was reduced to 4.35%, the lowest point since 1996. It is undeniable that the central bank’s reduction of interest rates has reduced the lenders’ pressure on capital to a large extent, and helps set free the vitality of the capital market. However, China’s lending rate is still relatively high, and many of the projects that have genuine need for funding are not offered sufficient financial support. In addition, due to the irrational behavior of investors during their investment, they have an impractically high expectation for investment products such as P2P and wealth management products, and such these excessively high expectations, on the one hand, expose the investors themselves to greater risks, and on the other hand, exacerbate the mismatch of resources caused by high lending rates. This is one of the problems that China has to cope with at the current stage. China’s current issues of high lending rates and excessive expectation for investment returns will be discussed later.

5. Lowered Cost of Acquiring Technology
If capital is the material guarantee for a country’s economic and social sustainable development, then the technology constitutes the core competitiveness of the country’s long-term development. In today’s world, the frequency and quality of technological development are enhancing, and for a country, if it can occupy a commanding ground in terms of technical factors, it will be able to take advantage of the position in the global chain and gain greater profits and better opportunities of development.

Judging from the current development of China’s economy, the cost of accessing advanced technology has declined. The reason for the reduction of this cost lies in the improvement of the quantity and quality of R & D personnel in China, and the willingness of newly added employees to invest in scientific research. As can be seen from the table below, the number of R & D personnel in China increased from 1.763 million in 2007 to 353.3 million in 2013, nearly doubling; in employment, the number of people engaged in scientific research per 10,000 has almost doubled, from 23.1 in 2007 to 45.9 in 2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Personnel (10,000 people / year)</td>
<td>173.6</td>
<td>196.5</td>
<td>229.1</td>
<td>255.4</td>
<td>288.3</td>
<td>324.7</td>
<td>353.3</td>
</tr>
<tr>
<td>R&amp;D Personnel per 10,000 Employees (people / year)</td>
<td>23.1</td>
<td>26.0</td>
<td>30.2</td>
<td>33.6</td>
<td>37.7</td>
<td>42.3</td>
<td>45.9</td>
</tr>
</tbody>
</table>

Source: China Science and Technology Statistics

In terms of academic research, the publications and quotations of papers in science and technology have been on the rise, and papers published home and abroad, such as SCI and EI, have witnessed increases.

![Figure 10 The Number of China’s Published Papers in Science and Technology](image)

Source: China Science and Technology Statistics

In terms of the practical application, there has been an improvement in the number and quality of patents. Over the 11 years from 2002 to 2013, the number of patent applications and the actual grants of patents rose nearly 10 times, and the number of patent applications increased from 253,000 to 2,377 million, the actual
amount of granted patents increased from 132,000 to 1.133 million pieces.

![Figure 11 China’s Number of Patent Applications and Granted Patents](image)

Source: China Science and Technology Statistics

In addition, China’s enterprises continue to “go global”, and they have received large amount of technical support through overseas mergers and acquisitions. China National Chemical Corporation (ChemChina) spent more than 500 billion Yuan in an acquisition bid for the high-end tire giant Pirelli and become the company’s major shareholder, enabling the relevant technology to be introduced into China. After Northeast Industries Group’s acquisition of Delphi’s Fuba’s receiving system, it has also acquired the world’s most advanced vehicle on-board receiving system. After Geely Holding Group’s acquisition of Volvo, it has achieved progress in the research and development. And the progress made in acquiring medium and compact models also contribute to further development of modular architecture CMA results, further illustrating the feasibility of overseas mergers and acquisitions for obtaining technical support.

At present, the relative scarcity of production factors in China’s economic development have undergone fundamental changes, and such changes render the supply-side structural reform all the more imperative. The further development of China’s economy requires advanced technology and sufficient capital to upgrade the backward industrial sector, improve environmental protection and enhance land use efficiency.

IV. Focus of the Supply-side Structural Reform

In order to promote the structural adjustment of the “13th Five-Year Plan” period, the central government put forward five concepts of development, and specified five detailed tasks for the development in 2016. We believe that to complete these tasks, we need to implement the supply-side structural reforms and achieve the transformation of China’s economy. We should take into account the aforementioned five factors, and we should address industrial overcapacity. In the agricultural sector, we should press ahead with intensive development and improve land use
efficiency. We should increase the accumulation of infrastructure, squeeze out the capital bubble and optimize the capital allocation.

1. Cutting Industrial Overcapacity

According to statistics of relevant departments, there are 22 industries in China that suffer from relative excess production capacity, and the industrial overcapacity rate exceeds 80%, and the steel, cement, electrolytic aluminum, flat glass, shipping industries have witnessed excessive capacities.

Taking non-ferrous metal industry as an example, the main business for the non-ferrous metal mining industry has seen its profit margins on a continuous decline. The profit margins have been slashed from 14% at the beginning of 2011 to about 7%. According to the non-ferrous metal price index (SMM index) provided by non-ferrous metals network, the price of non-ferrous metals continued to fall by about 25% after May 2015 and rebounded after November, but remained at a low level. In this case, non-ferrous metal mining industry has experienced a 15% loss in the mining industry, and a 17.5% loss in the smelting and rolling industry. The electrolytic aluminum unit price has reached 10,157 Yuan / ton at the end of 2015 and the integrated average cost reached 11638 Yuan / ton. A large number of enterprises have experienced losses, and in 2015, a number of electrolytic aluminum enterprises have been shut down. In addition, the cement industry has also encountered a serious excess capacity, and the profits continued to fall. China’s cement industry output reached 1.95 billion tons, a year-on-year decrease of 4.6%. From the perspective of price, the average gross profit of cement from January to September 2015 reached 47.5 Yuan per ton (a year-on-year decrease of 16.10 Yuan), and the net profit reached 10.68 Yuan per ton (a year-on-year decrease of 18.47 Yuan).

![Figure 12 Main Business Profit Margins in the Non-ferrous Metal Mining Industry (Percentage)](chart)

Source: CEIC Data
Similar problems plague the iron and steel industry, and as a major part for promoting and deepening the supply-side structural reform and judging from the situation of the domestic and international steel industry, China’s steel industry still faces huge pressure on reducing production capacity, and the reform outlook is not optimistic.

Generally, China’s steel industry still faces the issues of excess production capacity, and will continue to see the increasing trend. Lange Steel Network monitoring data shows that China’s crude steel production capacity in 2015 was only about 68%, less than 70%. Since 2012, China’s crude steel production capacity utilization continued to decline, and for years in a row the figure has been less than 75%. European countries and the United States generally believe that capacity utilization ratio of less than 75% is considered a serious surplus. Obviously, China’s steel industrial overcapacity has continued for many years. According to the National Bureau of Statistics, iron ore production in April 2020 was 102.576 million tons, up 2.3% over the same period last year; crude steel production was 694.21 million tons, up 0.5% over the same period last year; steel production 96.667 million tons, up 0.5% from last year. Iron and steel industry production output is still high, compared with the same period last year, showing growth momentum. However, once the steel industry production is re-launched after the shutdown, the enterprise will need a lot of funding for kick-starting the equipment, and in this case, many steel companies may even choose to continue production under losses. In the “13th Five Year Plan”, the steel industry production is still widening, and from the perspective of total production, a large number of iron and steel enterprises have not yet been drastically reformed, and they will carry on the old mode to continue production.

From the perspective of supply and demand side, China’s steel industries have gradually been stuck in a state of imbalance, and the release of domestic steel production capacity has not yet been significantly curbed. According to the “Analysis Report on China’s Iron and Steel Structural Steel Industry Market Prospects and Investment Planning in 2016-2021” released by the Industrial Research Institute, the national crude steel production in 2015 reached 804 million tons, a year-on-year decrease of 2.3%; the apparent consumption of domestic crude steel reached 700 million tons, a year-on-year decrease of 5.4%. With the decline of
downstream needs, the steel industry has encountered economic downturn. The decline of China’s domestic steel market is less than the decline in the demand, and the gap between supply and demand imbalances has increased the pressure on reducing production capacity to a large extent.

The imbalance between supply and demand in the iron and steel market contributed to sharp falls of the steel prices, and the corporate profits fell sharply. According to data released by the National Bureau of Statistics, in the first 11 months of 2015, ferrous metal smelting and rolling processing industry saw its operating income fall by 12.5%, and the total profit fell by 68.0% year on year. According to the data released by China Iron and Steel Industry Association, from January to November 2015, the key iron and steel enterprises achieved sales income of 2.6664 trillion Yuan, a year-on-year decrease of 19.3% and resulting in a loss of 53.132 billion Yuan, yet gaining profit of 24.387 billion Yuan compared with the previous year. The sales income profit margin was -2%, compared with 0.74% in the same period of previous year. From January to November, 51 enterprises underwent losses, an increase of 27 compared with the same period last year. Losses suffered by the loss-making enterprises amounted to 68.5 billion Yuan, an increase of 56.4 billion Yuan.

China’s steel industry market fundamentals gradually deteriorated, and it has been the industrial consensus to resolve the excess capacity. Under the current circumstances, the reform requirement for reducing production capacity is particularly urgent.

So is it possible that China rely on exports to address the issue of excess capacity? In 2014, China’s steel exports reached 93.78 million tons, an increase of 50.5% compared to 2013. Steel imports increased by only 2.5%. Thus, exports play a certain role in addressing the excess capacity. In 2015, China’s steel exports will exceed 100 million tons, and net exports exceed 90 million tons, but there are the issues of low export price and high import price, which highlight the necessity of steel industry’s structural transformation and the need for cutting production capacity. Reliance on exports to resolve the excess capacity is similar to drinking poison for relieving thirst, and it will not help contain the decline of iron and steel enterprises, nor help achieve technological updates and industrial upgrading. Meanwhile, such dependence on imports is unsustainable. According to the estimates of Haitong Securities, in 2015, China’s steel exports converted into crude steel accounted for 14.9% of all other countries in terms of crude steel production, which is a surprising figure and unlikely to increase further.

In contrast to the global scope, China’s steel industry has a slow progress in cutting production capacity. According to data released by the International Iron and Steel Association, global crude steel production fell to 1.623 billion tons in 2015, down 2.8% from 2014; compared to 2015, China’s crude steel production fell to 803.8 million tons, down from 22.3% in 2014. Although China’s crude steel production fell slightly in 2015, the first decline in more than 30 years, but compared to the general decline in the international environment, the decline in China’s crude steel production is still lower than the global average level. As the world’s largest steel producer, China needs to pace up the cutting of excess capacity in the steel industry and the pressure on
production capacity should not be underestimated.

In recent years, as the steel industry started cutting production capacity, the coking industry has also been hit hard, and the prices of coke and coking coal have decreased in 2015. In the end of November, Shanxi Jiexiu coke car price was 540 Yuan / ton, down from 880 Yuan / ton compared to the same period of the previous year, an annual decline of 39%. The Shanxi Linfen secondary metallurgical coke price was 590 Yuan / ton, down from 250 Yuan compared with the same period last year, a decrease of 30%. By the end of November 2015, the price of importing Australian coking coal was 650 Yuan / ton (tax included). Domestic coke prices are lower than international import prices. According to the China-Australia Free Trade Agreement, starting from the end of 2015, imports of Australian coking coal tariffs will be reduced from 3% to zero. Although the reduction is only equivalent to 20 to 30 Yuan of tariff reduction, the domestic coking coal market still undergoes a certain level of shocks, but from the perspective of cutting production capacity, adjusting structure and managing pollution, it can still be regarded as a positive event. It should be noted that much attention has been given to the haze of Beijing and Tianjin cities, and the reduction of the production capacity of the mine and coke steel in the region will bring immediate results. Relocating polluting enterprises to other provinces and cities is not a fundamental solution. Frequent haze provides opportunities for the development of the new energy. In 2015, the wind power and photovoltaic industries are no longer included in the list of excess capacity compiled by the Ministry of Industry and Information. As further breakthroughs are made in the technical bottleneck, green energy will play a more important role in replacing traditional fossil fuels and reducing pollution and carbon emissions.

Since the beginning of 2016, international commodity prices have rebounded. For instance, oil prices rose more than one-third, and copper, coal and other prices have moderately increased. We think that this phenomenon should be viewed dialectically. On the one hand, we can not reduce the intensity of structural adjustment due to the improvement of the international market. Otherwise, the current problems will continue to accumulate and lead to more serious crises. On the other hand, we should make full use of the current window of opportunity for capacity conversion, and replace the old capacity with cleaner and more efficient one. In the meantime, we should replace the existing investment with green investment. For some time, there is a voice that enhancing efforts of cutting capacity will lead to a series of risks amid the economic downturn. However, according to estimates, the risks of unemployment and the write-off of non-performing bank assets are within the controllable range.

The current excess capacity of steel is an indisputable fact. Does it arise from the cyclical factor? Or so to speak, in the next few years, will the rise in steel demand contribute to full utilization of production capacity? We think the answer is negative, and excess steel production capacity is rather structural and long-term. Elimination of production capacity is not simply for the purpose of “letting steel enterprises to make money”, but to achieve real industrial upgrading. The government and the enterprises need long-term vision and perseverance to bear the short-term “pain”.
Specifically, the government can contribute 4 billion to 7 billion Yuan to encourage the iron and steel enterprises in the mainland for a complete closedown. According to our estimates, due to the serious losses suffered by steel companies in the first three quarters of 2015, the profit for one ton of steel was only 0.5 Yuan, and in the fourth quarter, steel prices continue to decline. If we assume that the profit is 0.5 Yuan per ton of steel and the market interest rate is between 3% to 5%, then for each ton of production capacity, it would be equivalent to about 10 to 17 Yuan of assets, and therefore, eliminating 400 million tons of excess capacity will require about 40 to 68 billion Yuan subsidies. With the granted subsidies, the backward enterprises will be motivated to withdraw from the market. At the same time, shutting down backward enterprises also helps release a certain amount of land and labor factors, hence revitalizing the factors shackled by the “sunset industry” and fully tapping into their potential.

Some people are worried that cutting production capacity will lead to unemployment, resulting in economic and social instability. In response to this view, we believe that, first and foremost, unemployment will be short-term in nature. Cutting production capacity involves “subtraction” and “addition” as well as “multiplication”. Once backward production capacity is “subtracted”, then advanced production capacity in shortage will be added, and we can rely on technological innovation and national policy support as well as new economic hot spots to spread to other industries for achieving the “multiplier” effect and boost the GDP growth. In the process of “subtraction”, unemployment will rise, but effects of “addition” and “multiplication” will help to increase the number and quality of employment, so unemployment is temporary in nature. Meanwhile, in order to cope with the “wave of unemployment” when cutting the production capacity, we need careful planning. On the one hand, we should strictly enforce the law, and effectively phase out the enterprises equipped with backward technologies. On the other hand, we need to improve the old-age insurance, unemployment insurance and medical insurance systems to reduce the negative impact of unemployment. More importantly, China’s age-old working population began to decline in 2011, and imbalance in the labor market also led to labor shortage in some industries. Under such circumstances, the government should implement measures such as enhancing skills training to promote the re-employment of laid-off workers from backward production capacity, thus reducing the friction of the labor market.

Taking the employment of four major industries for example, namely, the coal, steel, nonferrous metals and cement industries. As of the end of 2015, China has a total of more than 440 million people engaged in coal mining and rinsing industry. More than 360 million people are employed in ferrous metal smelting and rolling processing industry, and more than 500,000 people are employed in ferrous metal mining industry. In the coal and steel industries that involve about 8 million employees, there were 2.5 million people employed in the non-ferrous industry by the end of 2015, and 900,000 people employed in the cement industry at the end of 2013. If we cut excess production capacity in the coal industry by 15%, steel by 25% and non-ferrous and cement by 20%, and then take into account the local governments’ urge to “complete the tasks with overachieved target” during the implementation of policy, the number of employees that might directly impacted will reach 3 million. Meanwhile, as the industries with excess capacity started asset restructuring and corporate upgrading, an effect of “metabolism” is
inevitable. As a result, there will be indirect impact from the policy of cutting excess production capacity with higher work efficiency and replacement of staff. We estimate that the total number of people affected may reach 5 million. Even the government offers a subsidy of 100,000 Yuan per person, the financial burden will not exceed 500 billion Yuan, and if the subsidies are granted during a five-year period, the resulting expenditure will not be considered too much given the current government revenue standing at the level 14 trillion Yuan.

The debt risks incurred during the process of cutting production capacity are also within the controllable range. In the aforementioned case, assuming that there is a corresponding proportion of enterprises suffering from bankruptcies and their debts all default, the non-performing bank loans will be about 600 billion, and the default credit bonds directly held by the bank will be about 80 billion. Added to some trust products, we believe that in the next five years, the bank may undertake the pressure on cutting excess capacity of about 750 billion. If the bad debt provisioning level stands at 2.5% of the total amount of credit, and as the total credit amount was 94 trillion yuan in financial institutions at the end of 2015, then about 2.4 trillion Yuan would be allocated for bad debts. In fact, as enterprises closed due to the cutting of production capacity may not completely breach the contract, and the cutting of “fat” will also improve the operations of the remaining healthy business conditions, their bad debt ratio might see further declines. From the holistic view, the banks are capable of bearing the pressure brought by bad debts.

When the excess capacity is effectively cut and the supply-side is well controlled, the prices of the steel and other industrial products will gradually pick up, resulting in improved corporate profitability and thus conducive to attracting funds for advancing the industry-wide technological innovation and upgrading. For example, the iron and steel enterprises with improved profitability can invest more funds into the R & D and production of high-grade steel, and help to change the unfavorable conditions of imbalanced import-export price. Specifically, because China is the world’s leading steel producer, after its backward production capacity is eliminated, the international steel prices will rise from the current 2000 ~ 2500 Yuan / ton back again to the level of 4000 ~ 4500 Yuan / ton (the price was the 2010 steel prices level, when the production capacity was about 700 million tons, equivalent to the current annual consumption.

If we take into account factors of the global economic recovery, the increasing demand for steel prices in the future, and the improved steel quality, the steel prices will be even higher, which will create necessary conditions for iron and steel enterprises to improve production technology and produce steel in a cleaner way. During the phasing out of backward production capacity, the government may implement certain incentivizing policies. For example, in the coastal areas, the government can establish a number of new and modern steel production capacities with imported iron ore and coal. The new steel plants process the iron ore and coal that come from the international market, and adopts the world’s premium quality raw materials as well as the cutting-edge production technologies, which will ensure the clean production. Deploying the steel and other heavy chemical industries in the coastal area also afford China the opportunities to better implement the development strategies such the “Belt and Road” Initiative. As India and other countries see their economy take off in the future and the shortage of capacity to build
infrastructure and promote industrialization, our modern steel plants can seize the opportunities to sell our products to these countries in large amount.

In this respect, the case of Shougang Steel is worthy of studying. After the Shougang Steel moved its production capacities from Beijing to Caofeidian, it not only integrated of the most advanced international steel manufacturing technology, but also developed a modern, ecological heavy industrial park. The steel plants run with compact process and are equipped with intelligent and efficient production lines, the finished products are shipped to the destinations around the world through the terminals for finished products. “Green production” is a major feature of the industrial park. The Jingtang company invested 7.596 billion Yuan in environmental protection, accounting for 11.21% of the total investment. Among which, there are 128 waste gas treatment facilities; 8 sets of wastewater treatment facilities contributing to annual savings of about 24 million tons of ground water resources. Zero emission is basically achieved for gas and waste water. In 2013, the Shougang Jingtang Company’s emissions of steel dust was 0.418 kg, SO2 emissions per ton of steel was 0.398 kg, the atmospheric environmental quality SO2 indicators are 24 micrograms / cubic meter, better than the national secondary standard of annual average of 60 micrograms / cubic meters. The artificial dust fall monitoring was 15.8 tons / square kilometers. From the perspective of SO2 emissions, Caofeidian Shougang’s sewage is only 9% of small steel mills, and 26.2% of the average level of key steel plants. Technology upgrading not only did not shrink capacity, but promote production, and production capacity increased from 8 million tons to 10 million tons, with the first-phase investment reaching 67.7 billion Yuan. During the first phase design, the annual output was 8.98 million tons of iron, 9.7 million tons of steel, 9.31 million tons of steel materials. Significant savings were also achieved in cost. On average, for each ton of finished products, a total of 100 to 150 Yuan will be saved, and according to the annual production of 9 million tons, the annual savings can reach more than 900 million Yuan.

It is worth emphasizing that backward industrial capacities most often plague the industries with high energy consumption and high pollution, such as steel, cement, electrolytic aluminum, flat glass, and shipbuilding industry. In this respect the elimination of backward production capacity is key link for combating haze, and can help a large number of Chinese cities to recover the blue sky and white clouds. Haze problems now spark widespread concerns, and have come to the point of “utmost urgency with no other choices”. In essence, combating haze requires addressing the root causes. High energy consumption and high pollution enterprises are undoubtedly the major sources of emissions, and we should strictly control the increment while reducing the stock, and take measures nationwide with coordination. For instance, steel production requires coke, and coke production and use will generate a lot of greenhouse gases and other pollutants. Therefore, phasing out backward production capacity offers a set of corresponding solutions for the mounting environmental factor costs from the supply-side structural adjustment.

B. Efficient Agricultural Development

The No. 1 Central Document of 2016 pointed out that China’s grain is basically self-sufficient. However, this
does not mean China’s food problems have come close to solving. Current status is that price inversion in domestic and international food market is serious. In the answers Premier Li Keqiang gave to the correspondents during the two sessions of NPC and CPPCC in 2016, he mentioned that the average price of grain products in China, such as corn, wheat and rice, is about 600 Yuan per ton higher than international price.

The following graph shows the futures prices of corns delivered at the Dalian Commodity Exchange (DCE) and the Chicago Board of Trade (CBOT) in March 2016. The corn prices at the CBOT are calculated based on the spot closing price of USD/CNY on the day or the previous trading day. In terms of the futures prices of corns on March 8, 2016, the closing price was 2001 Yuan/ton at the DCE, while 918 Yuan/ton at the CBOT. Foreign corn prices are still lower than domestic ones even the 65% tariff rate is considered.

Graph 14 Futures Prices of Corns Delivered at the Dalian Commodity Exchange and the Chicago Board of Trade in March 2016

In addition to corn and other grain reserves, reserve cotton is facing a similar problem. Futures prices of cotton delivered in March 2016 also experienced inversion at home and abroad. On March 8, 2010, the price was 10730 Yuan/ton at the Zhengzhou Commodity Exchange (ZCE) and only 8349 Yuan/ton at the New York Futures Exchange (NYBOT). According to the price index system of the National Cotton Market Monitoring System, China Cotton Network, the national cotton price index, CN Cotton A corresponds to the same quality grade of cotton as the international cotton price SM 1-1 / 8 does. On March 16, 2016, CN Cotton A index was 12586 Yuan/ton, corresponding to 70 cents/lb of the SM 1-1 / 8 index, equivalent to about 10062 Yuan/ton. This is the CNF price of international cotton transporting to China’s main port (cost plus freight, excluding customs duties, VAT, port charges and insurance). This price further shows that the import price of cotton is lower than the domestic one.
Graph 15 Futures Prices of Cotton delivered at the Zhengzhou Commodity Exchange and the New York Board of Trade in March 2016

Under the current situation of price inversion, tariff protection and import quota restrictions on grain still exist in China. Such restrictions are contrary to the goal of improving the efficiency of market allocation of resources from an economic perspective. In the long run, price inversion is not conducive to the sustained, stable and healthy development of China’s economy and society under the New Normal.

Therefore, we try to put forward the following measures to ameliorate the food problem that China needs to face and cannot avoid.

First, further liberalize tariff protection and food quota restrictions, and increase the share of grain imports. At this stage, price inversion of domestic and international food market, which is to purchase the imported food from the international market, is in line with the individual economic demands of China’s vast number of consumers. At the same time, import grain into the domestic food market at a low cost is conducive to reducing the overall price of domestic grain and reduce the basic living costs of the people, thereby increasing the level of consumption and quality, release the consumer potential, further play the decisive role of the market in resources allocation, and improve the efficiency of market resource allocation.

Second, provide farmers with a one-time subsidy instead of the existing reserve grain subsidies. This measure, on the one hand, protects the farmers’ existing interests to a certain extent, and reduces the impact on food producers from lower food prices in the domestic market; on the other hand, it releases the rural labor force from the land, increases the supply of labor factors, and eases the pressure on rising labor costs. From the perspective of urbanization, China’s urban development is still at a low level. Farmers move to the cities and it increases the
number of urban population in the proportion of the total population, promoting the level of urbanization to a certain extent. On the other hand, farmers become migrant workers to make money and settle down can somehow help destocking in the third and fourth tier cities. From the perspective of employment structure, China still lacks labor forces, and phenomenon of “labor shortage” and “recruitment difficulty” is common. To release rural labor force, economic rewards, public resources and other advantages will drive the farmers to work in cities, and make structural adjustment to the labor supply.

Third, keep the fertility of the idle land. In response to current price inversion, we will increase the amount of imported food mentioned in the first measure. At the same time, with a long-term view, we still need to ensure the quantity and quality of existing arable land, with temporary fallow to restore soil fertility. In the unpredictable future, should the international food market experience price shocks and fluctuations, the market forces would be able to drive the labor force to return to the land, ensure the domestic food supply in a timely and efficient manner with high quality, and maintain the smooth operation of the domestic grain market. For the arable land that has been overly damaged and could not be restored, it can be converted to land elements, the potential of which can be released from agriculture. In addition, the “red line of the 1.8 billion-mu arable land” that guarantees the quantity of arable land, can also be flexibly adjusted on the basis of the need to adapt to economic and social development. Aiming at the land stress in the first-tier cities such as Beijing, Shanghai and Guangzhou, the accelerating upgrading of the industrial structure, and the development of the natural and social conditions in the Northeast and other old industrial bases such as vast land, optimum climate and fertile land, it is necessary to further strengthen the national macro-control, allocate the “red line of the 1.8 billion-mu arable land” according to local conditions, improve the output efficiency per unit area, and promote a high quality, efficient and coordinated development of China’s economy and society.

At this start of the “13th Five Year Plan”, to apply and implement the five major development concepts of “innovation, coordination, green, open and sharing” in the national food policy adjustment and optimization, could help further adapt to the economic globalization, better improve people’s livelihood in China and promote social harmony and stability.

(C). Outlook for Infrastructure Construction Adjustment

Investment in infrastructure construction has always been an important driving force for China’s economic development. Public discussion on over-investment in infrastructure has long been one of the key topics of experts, scholars and the whole society in China. Indeed, in terms of the capital stock of infrastructure investment, China maintains an average of about 10% growth rate in the past 20 years; in the horizontal comparison among the BRIC countries, China’s infrastructure stocks rank first. However, due to the large population base in China, the infrastructure stock per capita is still low, and significant regional differences still exist. The situation is worse compared with the developed countries. Accordingly, we believe that there is still a certain amount of space for China to grow infrastructure investment.
Table 3 Comparison of Infrastructure between China and G7 Countries

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>G7 Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Railway</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mileage Density</td>
<td>116.93</td>
<td>493.47</td>
</tr>
<tr>
<td>Mileage Per Capita</td>
<td>0.82</td>
<td>5.3</td>
</tr>
<tr>
<td>Airport Density</td>
<td>0.21</td>
<td>9.51</td>
</tr>
<tr>
<td><strong>Aviation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASK Per Capita</td>
<td>1135.49</td>
<td>7533.57</td>
</tr>
<tr>
<td><strong>Highway</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mileage Density</td>
<td>4668.88</td>
<td>15566.45</td>
</tr>
<tr>
<td>Mileage Per Capita</td>
<td>33.5</td>
<td>138.85</td>
</tr>
<tr>
<td><strong>Pipeline</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mileage Density</td>
<td>110.52</td>
<td>544.24</td>
</tr>
<tr>
<td>Length Per Capita</td>
<td>0.77</td>
<td>8.63</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International Bandwidth Per Capita</td>
<td>5</td>
<td>162.69</td>
</tr>
<tr>
<td>Wide Band Users in Every 100 People</td>
<td>13.63</td>
<td>32.91</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy Consumption Per Capita</td>
<td>2142.81</td>
<td>4406.79</td>
</tr>
<tr>
<td>Electricity Consumption Per Capita</td>
<td>3475.01</td>
<td>8826.44</td>
</tr>
</tbody>
</table>

Sources: CEIC, CIA, WEF, WIND, World Bank

At the same time, investment in infrastructure needs to be forward-looking and investment plan needs to be made in advance. In addition, based on previous analysis, in terms of factors of production, the scale of capital reserve in China has expanded and the cost has been reduced; while the land elements have a tendency of increasing shortage and rising prices. Therefore, we should make use of the adequate capital reserves to expand investment in infrastructure before the land factor prices being borne any more, so as to promote the overall economic and social development.

In view of the above situation, we try to propose the following measures to improve the status of infrastructure investment in China.

First, diversified investment subjects. At present, China’s infrastructure investment is led by the government. As China’s market-oriented reform coming to a new phase, market should also play a decisive role in resources allocation in the field of infrastructure investment. On the one hand, it could expand the funding channels of infrastructure investment, expand the scale of investment, and achieve the optimal allocation of resources under the market-oriented guidance; on the other hand, all sectors of society could share the benefits of infrastructure investment, compete and supervise the results of the investment, thereby improving the quality and efficiency of the project.

Second, balance regional differences. China enjoys a vast territory. It brings us rich land resources, but also inevitable differences of natural factors, which further lead to different development of social factors among various regions. At present, the Yangtze River Delta and the Pearl River Delta enjoy the highest stock of infrastructure per capita, while the six provinces in the central part of China have the lowest, and the western region with rich resources share the same level of infrastructure stock per capita as the Bohai Sea region. Therefore, when carrying
out infrastructure investment in the future, we should focus on the current regional differences in China, increase investment in the six central provinces, follow-up and improve the investment in the western region with rich resources and the Bohai Sea region, while not overlooking the investment in the Yangtze River Delta, the Pearl River Delta and other areas with regional superiority.

Third, strengthen the investment in environmental protection. In addition to transportation, ports and airport construction, infrastructure also includes construction of urban drainage system, gas and electricity supply. Under the shadows of haze weather, China’s current environmental situation is not optimistic. The concept of “not only gold mountain and silver mountain, but also clear water and green mountain as well” is becoming increasingly popular, the concept of innovated, coordinated, green, open and shared development was also put forward during the Fifth Plenary Session of the 18th Central Committee of the Communist Party of China. Environmental management has gradually become an important issue that China must face for future economic and social development. Therefore, based on the status quo of relatively improved traditional infrastructure such as highway and bridges, we should increase investment in urban sewage treatment and city greening in the future, which is essential for the sustainable development of China’s economy and society.

(D). Outlook for Capital Reform

The previous part of this paper mentions that while the current one-year loan interest rate has decreased to 4.35%, it is still very high. As a non-bank financial instrument, the trust is an important supplement to the bank loan in China. Compared with traditional bank loan, the trust has the advantages of flexible system and low risk, but its higher interest rate also reflects problems in the current economic and social development.

In addition, some of the interest rates of China’s financial products are unreasonably high. On December 22, 2015, Kunming Municipal People’s Government issued a “Notification on FYME Metal Exchange” which announced that after extensive investigation, FYME Metal Exchange Co., Ltd. is suspected of criminal problems in its business activities. The public security organs have reported the case on file for investigation. The FYME Metal Exchange launched a product called “Rijinbao”, the annual yield of which would be 12% -14%, and the profits could be withdrawn for use at any time, and be transferred to the account on a daily basis. This financial product had clearly surpassed the market interest rate, and was once quite popular. With liquidity problems surfaced later, the product failed to pay, and there was a financial gap of more than 40 billion Yuan, involving a total of 220,000 investors. Another financial product “eZubao” is also now the target of blame for not being able to pay. “EZubao” is famous for its “start investing with just 1 Yuan” policy. It has attracted 74.7 billion Yuan from 890,000 investors after being launched for 505 days, becoming the fourth major player in the Internet financial industry after Lufax, Wangxin and Hongling Venture Capital. From what “eZubao” has promised, the annual yield would be 9% -14.6%, 1% of commission for the financial planners, so the cost of the product would be as high as 10% -15% or more. In the current industry, however, the financial lease debt income is 7% -8%, almost half as much as “eZubao”. Facing such unreasonably high
“profits”, investors were not even prepared to deal with possible breach of contract, and a lot of farces were made. This fully shows that China’s investors have a strong speculative mentality and immature investment behavior.

Huge risks are hidden behind the universal phenomenon of high interest in the financial market. In some sense, there are bubbles exist in China’s financial market that need to be squeezed out through the reform of capital so that the capital can be rationally allocated to projects with real high returns.

Therefore, we try to put forward the following measures to reform the field of capital.

First, smooth the transmission mechanism of monetary policy. At present, the central bank is increasing its open market operations both in frequency and scale, and macro-control the loan interest rate in the financial market by adjusting reverse repurchase and MLF policy interest rate. The transmission effect shows a rising trend in general. However, according to Ma Jun’s research (2016), the transmission efficiency of China’s short-term market interest rates for the loan interest rate is only 20% -80% of that of the United States. Although China’s current short-term market interest rate can be conducted to the loan interest rate to a certain extent, the effect is limited and inefficient. Therefore, this paper proposes that China should improve the transmission mechanism of monetary policy and the transmission efficiency between short-term and long-term interest rates, and give full play to the macro-control function of the central government.

Second, further liberalize the loan interest rate. Since October 2015, the central bank has officially lifted the upper limit of deposit rates, but until now, the benchmark deposit and lending rates are still important indicators for the society to increase or cut the interest rate. Under the general guidance of interest rate liberalization reform, the loan interest rate will be liberalized gradually in the future. Liberalization of the loan interest rate depends on the establishment and improvement of China’s interest rate market mechanism.

Third, guide investors’ expectations in a reasonable way. In the afternoon of December 28, 2015, the “Interim Measures (draft) for Managing Business Activities of the Internet Lending Information Agencies” (Measures), the development of which was lead by China Banking Regulatory Commission (CBRC), was officially announced. Since the boom of the P2P industry in 2014, financial regulators, who only gave general requirements in the past, finally set up rules this time. The “Measures” stipulates that investors should “bear their own responsibilities and risks,” but clearly investors will not do this. Under this background, it is important and necessary to properly prick the financial bubbles, educate investors to investment rationally, and face the market risks in a right way. These measures will enhance the efficiency of the capital market and maintain the market order. Pricking the financial bubbles and cracking down “fraud” agencies that rely on high interest rates to absorb malicious funds will also help reduce investors’ expectations and guide the transfer of funds to the real economy, thereby reducing the financing costs of the real economy and promoting business investment and technological innovation.

Smoothing the transmission mechanism of monetary policy and further liberalizing the loan interest rates are both designed to make better play of the market’s decisive role in the allocation of capital resources through reform,
so that capitals can be properly distributed to a project with real high rate of return. In addition, with reasonable guidance to investors’ expectation, implementing strategic objectives of “steady growth for development”, and actively responding to fluctuations in the financial markets will ease investors in the uncertainties of China’s future economic growth to a certain extent, so as to maintain the stability of the financial market.

IV. Summary and Policy Suggestions

In the early stage of the “13th Five Year Plan”, the economy is still under downward pressure and foreign situation is relatively complex. In this context, the Chinese economy is facing the conversion from the old growth momentum to the new and structural optimization. We believe that the supply side reform is still an important task that requires bold choices. We mainly discuss the four aspects of industrial overcapacity, price inversion of agricultural grain, infrastructure construction and reform in the field of capital.

Based on the relative scarcity of production factors in different stages of economic development, this paper explores the economic basis behind the supply side structure reform. We believe that after more than ten years of development, the labor force, land and environmental costs of China's economy have increased significantly, while the cost of capital and technology has been relatively reduced. The adjustment of economic structure according to the relative changes in factor costs is the driving force and fundamental economics logics of this round of reform, significantly different from the two rounds of reforms in the early eighties and the late nineties which focused on “shortage” and “close down, suspend operation, merge with others or shift to different line of production”. Based on this, we believe that the supply side structural reform should start from the industry, agriculture, infrastructure and capital bubble squeezing. For industries with excess capacity, the government should speed up the pace of reform, make brave choices and achieve industrial upgrading; for the price inversion in the domestic and international food market, the government should import grain, release labor force and the land under the premise of ensuring the land fertility; for the phenomenon of huge infrastructure investment but limited stock per capita, the government should pay attention to the diversification of investment subjects and the balance among different regions and construction projects; for the still high interest rates in the capital field, the government should squeeze out the bubbles and manage reasonable expectations of interest rates. These measures are also counterproductive to these five elements, and can promote the release of their potential and ease the pressure. Here, we put forward more specific policy recommendations on the two aspects of industrial overcapacity and price inversion of agricultural grain.

In view of the current price inversion in domestic and foreign food market, we recommend that the government further liberalize tariff protection and food quota restrictions to increase the share of grain imports. This measure will also reduce the prices of domestic food and people’s living costs. For farmers who grow reserve grain, we recommend that the government grant farmers with a one-time subsidy to replace the existing reserve grain subsidies. At the same time, the measures will also release this part of the labor force and increase labor supply to tackle the common problems of “labor shortage” and “recruitment difficulty”. Driven by economic rewards and public resources, the release of rural labor force will encourage farmers to become migrant workers, so as to make
structural adjustment of the labor supply. At the same time, we must pay attention to maintaining the fertility of idle land. Once emergence of foreign food prices rising sharply surface in the unforeseeable future, the market forces can also drive the labor force to return to the land, ensure the domestic food supply in a timely, efficient and quality manner, maintaining the smooth operation of domestic food market price.

In terms of infrastructure construction, despite its significant growth, there is still room for improvement in stock per capita and regional balance. We suggest that the government diversifies the investment subjects to change the status quo of government leading infrastructure investment, so as to not only expand the channels of funding sources and investment scale, and achieve optimal allocation of resources, but also share the benefits of infrastructure investment among all walks of life, and strength supervision to improve the quality and efficiency of the project. At the same time, the government should also balance the regional differences, increase infrastructure investment in the six provinces of the central region, follow up and improve the investment in the western region with rich resources and the pan-Bohai region. But the government should not neglect the investment in the Yangtze River Delta, Pearl River Delta and other areas of with regional advantages. In addition, the government should strengthen the investment in environmental protection. At present, highways, bridges and other traditional infrastructure in China has been improved, the government should increase investment in urban sewage treatment, urban greening and so on, which will be of great significance for China’s economic and social sustainable development.

In terms of the problems in the field of capital, the government should first smooth the transmission mechanism of the monetary policy, improve the transmission efficiency between short-term and long-term interest rates, and give full play to the macro-control functions of the central institutions. Second, the government should establish and improve the interest rate market mechanism, and further liberalize the loan interest rate. Finally, the government should also rationally guide investors’ expectation, moderately prick the financial bubbles, and educate investors to conduct rational investment and how to face market risks properly, in order to enhance the efficiency of capital markets and maintain the market order. Meanwhile, reducing investor expectations on profits will also allow the transfer of funds to the real economy, thereby reducing the financing costs of the real economy and promoting business investment and technological innovation.

In the process of structural reform on the supply side, the five elements of the land, environmental protection, labor force, capital and technology are incalculable driving forces. In turn, the adjustment and deployment of the supply side structural reform made in the fields of industry, agriculture, infrastructure and capital also contributed to the improvement of the high cost, high demand, low supply status of the five elements.

The supply side structural reform during the “13th Five-Year Plan” is comparable to chemotherapy detoxification for Chinese economy. We suggest that the government should speed up the pace of reform, make courageous choices, and completely remove this “malignant tumor” with the determination to even “cut its own wrist”. If the pace of reform is slow, toxins will continue to affect the trend of China’s economy, and even the risk of
proliferation. On the contrary, once the “tumor” completely removed, the Chinese economy will once again embark on a healthy and rapid development path.

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